APPENDIX M: GIS METHODS FOR DETERMINING OLD-GROWTH FOREST HABITAT FOR NORTHERN SPOTTED OWLS AND MARBLED MURRELETS

Acreages of endangered species habitat, including old-growth forest, second-growth forest lands, and lands with characteristics suitable for northern spotted owl and marbled murrelet nesting, were calculated using computer-based geographic information system (GIS) technology. In GIS terminology, a theme is a combination of characteristics or features that are geographically referenced to a point on the surface of the earth. The procedure of identifying a set of features as belonging to a group is termed classification. Several classifications may be combined into a theme. Different themes are sometimes referred to by a convenient title such as "old growth," but each theme may have been developed using different criteria.

GIS classifications of vegetation are sometimes very different even though the classification has the same title because the computer users who created a theme needed different information than another user. A wildlife biologist interested in habitat suitable for northern spotted owls has a different perspective than a vegetation manager interested in restoring second-growth forests to conditions found in old-growth forest. The relative spatial scale at which vegetation is classified also results in different classifications of a single point in space.

Thus, an "old-growth" theme was defined by different resource specialists in the parks in three ways: (1) the absence of cutting in coniferous forest stands; (2) defined as uncut on other vegetation themes and therefore defined as old- growth by a process of exclusion; or (3) visible on orthophotographs as not having been logged. (Orthophotographs are satellite photographs that have been corrected for geographic distortions caused by earth rotation and curvature, satellite motion, attitude, viewing perspective, and relief displacement.)

The type of vegetation in RNSP forest stands was classified based on 1:12,000 enlarged and 1:24,000 rectified orthophotographs; 1:100,000 unrectified NASA U-2 orthophotos; SPOT imagery from satellite photography; and visual review of aerial photographs at several different scales. Some field work was done to check the reliability of classification based on aerial photography. The year a stand was last logged was obtained from timber company records or comparison of aerial photographs taken at different times.

The year a stand was last logged was used to developed a theme called "cut history." Because the 1:6,000 aerial photography on which cut history was based covered only the Prairie Creek and lower Redwood Creek basins in the southern part of the parks, different themes were developed to integrate vegetation parkwide with cut history. The cut history theme classifies areas logged before 1950; the last logging cycle in 1976–78; and five 4-5 year intervals from 1950 through 1975.

Some coniferous forest stands were clearcut, and no large trees were left standing. Large old trees remained after logging in other forest stands. The "residual old-growth" theme measures the relative amount of residual large trees and canopy cover that meet the criteria of suitable nesting habitat for northern spotted owls or marbled murrelets, as determined by the parks' wildlife biologists. "Residual old growth" ranges from small stands of 5 to 10 trees together to single trees left as part of the seed-tree restocking harvest method and scattered over a cut block. Five categories of "old growth" are included in the final theme used to determine suitable old-growth nesting habitat for murrelets and spotted owls: old-growth coniferous forest; coniferous forest with greater than 50% of the original stand remaining; coniferous forest with 20% to 50% of the original stand remaining; coniferous forest with 20% or less of the original stand remaining; and no large trees remaining.